

REMARKS

Claims 1, 16 and 17 have been amended. New claim 19 has been added. Claims 1-9 and 16-19 are currently pending in the present application. Reconsideration of the present application is respectfully requested in view of the foregoing amendments and the following remarks.

Claims 1-9 and 16-18 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kelkar and Alvarez of record, both of which have been discussed in detail in previous responses. These rejections are respectfully traversed. It is respectfully submitted that no reasonable combination of the art of record teaches or suggests the combination of limitations recited in the pending claims.

Referring to the earlier Kelkar reference, the Response to Arguments section of the present Office Action notes that “the uppermost layer of the pad itself is made of solder wettable Cu (3, 30+). The fact that Kelkar covers the trim pads with a non-solder wettable, electrically conductive and non-corrosive protective cap doesn’t change the fact that the trim pad itself is solder wettable.” It is respectfully submitted that the cap of Kelkar is effectively a part of the trim pad. However, to avoid any possibility of confusion, claim 1 of the present application has been amended to make it clearer that the probing is done directly on the solder wettable portions of the trim pads. Thereafter, an electrically insulating coating is applied to exposed solder-wettable surfaces of trim pads (i.e., the undercoating is applied after the probing, trimming and testing operations have been performed). In contrast, the earlier Kelkar reference takes a much different approach. More particularly, the trim pads used in the earlier Kelkar reference include non-solder-wettable protective caps, and the probing, trimming and testing operations are conducted on these non-solder-wettable structures.

Amended claim 1 now specifically requires,

“forming contact bumps on a plurality of the contact pads, wherein the solder-wettable electrically conductive trim pads are exposed on the active surface of the wafer during the forming of the contact bumps;

probing the wafer after the contact bumps have been formed, wherein the wafer probing includes,

a trimming operation that includes directly probing solder-wettable portions of the plurality of exposed solder-wettable electrically conductive trim pads and trimming selected circuits associated with selected trim pads, and

a testing operation that involves probing at least some of the plurality of contact bumps to test selected functionalities of the integrated circuits; and

applying an electrically insulating undercoating to the active surface of the wafer that directly contacts and covers the solder-wettable trim pads while leaving at least portions of the contact bumps exposed, the undercoating being applied after the wafer probing, whereby the wafer may be trimmed and tested at substantially the same stage of wafer processing.

Thus, it is respectfully submitted that claim 1 now clearly requires that the probing and trimming operations are performed directly on solder-wettable portions of the plurality of exposed solder-wettable electrically conductive trim pads. Furthermore, it is submitted that claim 1 now also clearly requires that the electrically insulating undercoating is applied to the active surface of the wafer such that the undercoating directly contacts and covers the solder-wettable surfaces of the trim pads.

In contrast, according to the earlier Kelkar reference, and particularly FIG. 5b and column 4 lines 49-64, “the trim pads are covered by electrically conductive protective caps in step 522,” and subsequently, “In step 524, contact bumps are put on bond pads.” Still later, “a wafer probe is performed in step 528 to test the contact bumps for functionality and to trim the trim pads so that the die characteristics will meet the required specifications (column 5 lines 8-10).” Thus, according to the earlier Kelkar reference, the electrically conductive and non-solder-wettable caps are applied to the trim pads before the contact bumps are formed on the contact [bond] pads and prior to trimming the trim pads.

In the earlier Kelkar reference, care is taken to apply the protective caps for use in preventing solder bridging. The caps are provided before the trimming operation, which in turn is before the package is mounted on a substrate. As recited in the Abstract of the earlier Kelkar reference, “the protective caps act as barriers between the trim pads and solder used to form solder bumps when the IC package is mounted onto a substrate.” Thus, the primary purpose of the protective caps is to prevent solder bridging during mounting of the IC device onto a substrate. It is respectfully submitted that applying an undercoating prior to mounting the IC device (as is required by the pending claims) described by the earlier Kelkar reference would eliminate the need for the primary articulated purpose of the protective caps. In other words, since preventing solder bridging between the trim pads and solder bumps during mounting of the IC device is the primary purpose of the earlier Kelkar reference, as well as the present invention,

it is respectfully submitted that a person of ordinary skill in the art wouldn't be motivated to modify the Kelkar reference to apply an undercoating as recited in the pending claims.

Thus, it is respectfully submitted that those of ordinary skill in the art would not in any way have been motivated by the Alvarez reference to modify the teachings of the earlier Kelkar reference in the manner that they have been combined in the outstanding rejection. In view of the foregoing, it is respectfully submitted that the outstanding rejections of claim 1 and its dependents should be withdrawn for at least this reason.

New independent claim 19 recites similar limitations as those recited in pending independent claim 1, and hence, it is respectfully submitted that claim 19 is patentable over the art of record for at least similar reasons as those described above with respect to claim 1.

CONCLUSION

In view of the foregoing it is respectfully submitted that the present application is now in condition for allowance. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,

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